Work Plan
(Revised)

PCB Release Response Assessment and Remediation

Grace Pacific Lower Makakilo Facility
91-920 Farrington Highway, Kapolei, Hawaii

TMK No. (1) 9-1-016:004

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TMK No. (1) 9-1-016:004

Prepared for:

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Project No. 113102

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ALS	Australian Laboratory Servcies
amsl	above mean sea level
AST	aboveground storage tank
BES	Brewer Environmental Services
bgs	Below Ground Surface
CFR	Code of Federal Regulations
cm	centimeter
DLNR	Department of Land and Natural Resources
DOH	State of Hawaii Department of Health
DOT	Department of Transportation
EPA	Environmental Protection Agency
ESI	Environmental Science International
Field Manual	Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup
Grace Pacific	Grace Pacific LLC
HEER	Hazard Evaluation and Emergency Response
IDW	Investigation Derived Waste
LCS	Laboratory Control Sample
MCC	Modular Control Center
mg/L	milligram per liter
MRL	Method Reporting Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
oz	Ounce
PAL	Project Action Level
PARCC	Precision, Accuracy, Representativeness, Comparability, and Completeness
PCB	Polychlorinated Biphenyl
PPE	Personal Protective Equipment
ppm	parts per million
QA	Quality Assurance
QAPP	Quality Assurance Procedures Plan
QC	Quality Control
%R	Percent Recovery
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SAP	Sampling and Analysis Plan
TMK	Tax Map Key
µg/100cm^2	Micrograms per 100 square centimeters
UIC	Underground Injection Control
UST	Underground Storage Tank
VRP	Voluntary Response Program

SECTION 1 – INTRODUCTION

Environmental Science International [ESI] has prepared this work plan on behalf of Grace Pacific LLC [Grace Pacific], for the polychlorinated biphenyl [PCB] release response assessment and remediation at the Grace Pacific Lower Makakilo Facility, hereinafter referred to as the "Property." The Property is located at 91-920 Farrington Highway, Kapolei, Hawaii. The Property is located at latitude 21.351766 and longitude 158.064362 (Figures 1 and 2).

The purpose of the release response assessment and remediation is to (1) assess and delineate the lateral and vertical extent of PCB-contaminated soil out to project action levels [PALs], and (2) remediate and properly manage and dispose of PCB items and PCB waste in accordance with Code of Federal Regulation [CFR] 40 Part 761 Subpart G. The work plan describes the release response assessment and remediation procedures, and includes a sampling and analysis plan [SAP] and a quality assurance procedures plan [QAPP].

1.1 PROPERTY DESCRIPTION

The Property is located on the south side of the Waianae Range, approximately one mile northeast of Makakilo, in the Ewa District of Oahu (Figures 1 and 2). It is located approximately 1.85 miles north of and above the underground injection control [UIC] line, at a surface elevation of approximately 120 feet above mean sea level [amsl] (Figures 2 and 3). The topographic gradient varies across the Property; the north corner of the Property has not been graded or quarried and is at a much higher elevation than the remainder of the Property. In general, the ground surface of the Property slopes from northwest to southeast. The nearest surface water body is Kaloi Gulch (Figure 2).

The Property occupies approximately 54.179 acres and is owned by Grace Pacific. The Property is identified by the City and County of Honolulu Real Property Assessment Department as Tax Map Key [TMK] No. (1) 9-1-016:004 (Figure 4). The land is zoned as *AG-1 Restricted Agriculture District*. Primary access to the Property is via Farrington Highway. The Property is bordered on the north by a Naval Reserve site and vacant land, on the east by Farrington Highway, on the south by Kapolei Knolls (a residential subdivision) and a Naval Reserve site, and on the west by H-1 Freeway (Figure 5).

The Property was formerly used as an aggregate processing facility from the mid-1970s to 2012. Aggregate processed at the Property was obtained from an adjacent quarry, hereinafter referred to as the "Upper Quarry" (Figure 5). Other industrial operations were also conducted at the Property and are discussed further in Section 2. In 2012, industrial operations at the Property were shut down and the Property is currently not in use.

In 2011, in anticipation of industrial operations shutting down, Grace Pacific entered into the Voluntary Response Program [VRP] with the State of Hawaii Department of Health [DOH] Hazard Evaluation and Emergency Response [HEER] Office. Grace Pacific entered into the VRP to conduct environmental assessment, release response activities, and remediation under the close oversight of the DOH HEER Office. Grace Pacific is currently preparing the Property for the site characterization

work associated with the VRP. Currently, the Property is completely fenced in and there is a 24-hour security service that patrols the Property.

1.2 PHYSICAL SETTING

1.2.1 Climatologic Conditions

Climatologic conditions in the area of the Property consist of warm to moderate temperatures and low to moderate rainfall. The Property is leeward of the prevailing east to northeasterly trade winds. The average annual precipitation is 24 inches, which occurs mainly between November and April (State of Hawaii Department of Land and Natural Resources [DLNR], 1986). The adjusted annual pan evaporation rate is approximately 80 to 90 inches (DLNR, 1985). Average temperatures range from the low 60's to high 80's (degrees Fahrenheit) (Atlas of Hawaii, 1983).

1.2.2 Regional and Site Geology

Oahu consists of the eroded remnants of two large shield volcanoes, Waianae and Koolau. The Property is at the north edge of the southern plain of the Waianae volcanic shield. The plain, termed the *Ewa Plain*, is an emerged coral reef that formed during the 25-foot (Waimanalo) stand of the sea (Macdonald et al., 1983). The basalt shield-building lavas of the Waianae range are termed the *Waianae Volcanic Series* (Stearns and Vaksvik, 1935). The *Waianae Volcanic* Series is divided into three members – lower, middle, and upper. The lower member is composed of tholeiitic basalt lava flows and pyroclastic deposits that form the bulk of the Waianae shield. The middle member is composed of tholeiitic and alkalic basalt lavas and pyroclastics deposited in the central caldera. The upper member consists of hawaiites and alkalic basalts that form a thin veneer on the upper surface of the volcano.

The Property is located on lavas belonging to the Kolekole Member of the *Waianae Volcanics* (Presley et al., 1997). These lavas are well exposed in the walls of the Upper Quarry. Late-stage eruptions of the Waianae volcano produced several cinder cones at the south end of the Waianae shield, including Puu Makakilo. Based on records of the drilled wells (Stearns and Vaksvik, 1938), the subsurface geology consists of alternating layers of massive basalt and clinker, with interbedded cinder.

The soils in this area belong to the *Ewa Series* (specifically, the *Ewa silty clay loam* and the *Ewa stony silty clay*) and the *Mahana Series* (specifically, the *Mahana silty clay loam*) (Foote et al., 1972). The Ewa silty clay loam consists of well-drained soils found on alluvial fans and terraces. These soils develop in alluvium derived from basalt and form on 3 to 6% slopes. The substratum is gravelly alluvium. Permeability is moderate, runoff is slow, and the erosion hazard is slight. The *Ewa stony silty clay* differs from the *Ewa silty clay loam* only in that it forms on 6 to 12% slopes, the surface layer includes stones, the runoff is slow to medium, and the erosion hazard is slight to moderate. The *Mahana silty clay loam* consists of well-drained soils found on uplands. These soils develop in volcanic ash and form on 12 to 20% slopes. Permeability is moderately rapid, runoff is slow, and the erosion hazard is slight.

1.2.3 Regional and Site Hydrogeology

Groundwater in Hawaii exists in two principal types of aquifers. The first and most important type, in terms of drinking water resources, is the basal aquifer. The basal aquifer exists as a lens of fresh water floating on and displacing seawater within the pore spaces, fractures, and voids of the basalt that forms the underlying bulk of each Hawaiian island. In parts of Oahu, groundwater in the basal aquifer is confined by the overlying caprock and is under pressure. Waters that flow freely to the surface from wells that tap the basal aquifer are referred to as *artesian*.

The second type of aquifer is the caprock aquifer, which consists of various kinds of unconfined and semi-confined groundwater. Typically the caprock consists of alternating sequences of nearly impermeable clays and coral, typified by the Honolulu-Pearl Harbor area of Oahu. This sequence separates the caprock aquifer from the basal aquifer. The impermeable nature of these materials and the artesian nature of the basal aquifer severely restrict the downward migration of groundwater from the upper caprock aquifer. There is no appreciable caprock in the immediate area of the Property.

Shallow groundwater in the area of the Property, which is part of the *Ewa Aquifer System* of the *Pearl Harbor Aquifer Sector* (Mink and Lau, 1990), is a basal, unconfined aquifer residing in flank lavas of the Waianae shield. It is a currently used drinking water source that is irreplaceable and highly vulnerable to contamination. The water table beneath the Property is approximately 120 feet below ground surface [bgs]. The direction of groundwater flow is probably southwest, towards Puu Palailai. The nearest drinking water supply well is located northeast and adjacent to the Property (Table 1.1). There are no drinking water wells downgradient of the Property. There is one industrial water well located on the Property (Well No. 2104-01) (Figure 5). The well is owned by Grace Pacific and was formerly used to supply water for industrial purposes.

Process water and storm water runoff at the Property is collected in five retention ponds (Ponds #1 to #5). Ponds #1 and #2 are located near the southwest corner of the Property and have been used historically as settling ponds for the former wash plant wash water. Pond #3 is southwest of the scale house and is used to collect storm water overflow from Pond #5. Pond #4 is north of and adjacent to the former Hawaiian Cement vehicle maintenance shop and is used to collect storm water runoff from the southwest portion of the Property. The water in Pond #4 flows via underground piping into the water hazards at the adjacent Kapolei Golf Course, which is located south and across Farrington Highway from the Property. Pond #5 is north of and above the former finishing plant and is used to collect and retain storm water from the land area between the Property and the H-1 Freeway.

TABLE 1.1
Nearest Water Wells
Grace Pacific Lower Makakilo Facility
Work Plan – PCB Release Response

Well ID Number	Well Name or Location	Year Constructed	Elevation (amsl)	Distance from Site (miles)	Gradient/Direction	Depth (feet bgs)	Owner	Status /Use
Non-Drinking Water Wells								
2104-01	Makakilo Quarry	1976	125	onsite	Onsite	176	Grace Pacific	Industrial
2103-01	Puu Makakilo	1942	210	0.26	Upgradient / Northeast	206	U.S. Navy	Observation
2103-02	Puu Makakilo	1942	140	0.47	Cross-gradient / Northwest	137	U.S. Navy	Observation
2103-04	Barber's Point Deep	1992	146	0.29	Upgradient / Northeast	490	U.S. Navy	Observation
2103-05	Barber's Point Shallow	1999	148	0.29	Upgradient / Northeast	300	U.S. Navy	Observation
Drinking Water Wells								
2103-03	Barber's Point Shaft	1943	200	Adjacent	Cross-gradient / Northeast	204	U.S. Navy	Domestic

Source: DLNR Commission on Water Resource Management (2010)
bgs below ground surface.
amsl above mean sea level.

SECTION 2 – BACKGROUND

2.1 PROPERTY HISTORY

1970s

In the mid-1970s, Pacific Concrete and Rock moved their quarry operations from the Palailai Quarry to the Property. A finishing plant, a vehicle maintenance shop (Maintenance Shop #1), and the Upper Quarry were constructed at this time. According to available records, a concrete batch plant (Concrete Batch Plant #1) was also planned, however, it is unclear as to whether Concrete Batch Plant #1 was ever constructed. According to people familiar with the Property, the concrete batch plant was always located south of the finishing plant (Concrete Batch Plant #2).

According to Grace Pacific personnel, during this time two diesel fuel underground storage tanks [USTs] were installed. The USTs were adjacent to Maintenance Shop #1 and the fuel dispensers were located along the roadway that led to Concrete Batch Plant #2. The UST systems were likely used to fuel Pacific Concrete & Rock mixer trucks.

1980s

In the early 1980s, Maintenance Shop #1 was shut down and Maintenance Shop #2 was constructed and put into service. It included service bays, a fuel loading/storage area, and a 550-gallon capacity waste oil UST. In addition, an asphalt plant (Asphalt Plant #1) was constructed by Hawaiian Bitumuls along the east side of the Property and put into service.

In the mid-1980s, Grace Brothers Ltd., purchased Pacific Concrete and Rock, renamed the company Grace Pacific Corporation, and took over operations at the Property. Asphalt Plant #1 was shut down and a new asphalt plant (Asphalt Plant #2) was constructed and put into service. Asphalt Plant #2 was located just east of Concrete Batch Plant #2 (between Concrete Batch Plant #2 and the fuel dispensers associated with the diesel fuel USTs).

In the mid-1980s, Hawaiian Cement took over operation of Concrete Batch Plant #2. In addition, the south corner of the Property was developed. These developments included the Hawaiian Cement vehicle maintenance shop (which contained a 1,500-gallon capacity aboveground storage tank [AST] used to store waste oil), the Grace Pacific trucking office, a fuel storage and loading area (which contained a 3,000-gallon capacity diesel fuel AST used for fueling vehicles), and an asphalt emulsion storage and loading area. The asphalt emulsion storage and loading operation included two 30,000-gallon capacity ASTs used to store SS-1, a 4,800-gallon capacity AST used to store fuel oil, and a 4,800-gallon capacity AST used to store MC-30.

In 1989, the 550-gallon capacity waste oil UST at Maintenance Shop #2 was removed; however, a closure report was not prepared and a closure assessment was not performed.

1990s

In the mid-1990s, Asphalt Plant #2 was shut down and a new asphalt plant (Asphalt Plant #3) was constructed and put into service. During the closure of Asphalt Plant #2, the two diesel fuel USTs and

the associated fuel dispensers and underground piping were removed and a closure assessment was performed (Brewer Environmental Services [BES], 1996). Asphalt Plant #3 was located northeast of Asphalt Plant #2.

2000s

Between the mid-1990s and early 2000, the quarry/stockpile area located in the southwest corner of the Property was filled in with quarry scalpings obtained from the Upper Quarry and then landscaped. In addition, the Hawaiian Cement vehicle maintenance shop was taken out of service. In or around 2005, the 3,000-gallon capacity diesel fuel AST in the Former Hawaiian Cement Maintenance Shop and Trucking Office Area was taken out of service and removed. In 2009, Concrete Batch Plant #2 and Asphalt Plant #3 were taken out of service and disassembled. In addition, the Grace Pacific trucking office was torn down.

In October 2011, in anticipation of industrial operations shutting down, Grace Pacific entered into the VRP with the DOH HEER Office. In December 2012, the remaining industrial operations including the finishing plant and Maintenance Shop #2 were shut down and taken out of service. Beginning in 2013, the aboveground structures at the Property began to be removed and demolished.

2.2 PCB RELEASE

On November 13, 2013, demolition of a Module Control Center [MCC] (Appendix A; Photograph 1 and 2; Figure 5) associated with the finishing plant was initiated using an excavator, backhoe, and bobcat. The MCC contains electrical components (e.g., electrical switches, etc.) associated with the former finishing plant. The excavator was being used to crush the MCC and segregate the debris. During demolition, the waste was being segregated and scrap metal was being placed into a 20 cubic yard roll off container and/or stockpiled near the MCC. During demolition, the excavator operator noticed oil dripping from an electrical component being crushed. The operator notified the Grace Pacific foreman (Mr. Steve Brooks) who in turn notified the Grace Pacific Environmental Compliance Manager (Mr. Joseph Shacat). It was determined that the electrical component was a capacitor and that the oil could potentially contain PCBs.

In response to the release, work was stopped and the stockpiles of debris, the roll-off container, heavy equipment, and the chassis of the former MCC were covered to prevent the spread of potential contamination (Appendix A; Photograph 3). In addition, the area was cordoned off and the capacitors (2 total) and visibly stained soil were placed in a 55-gallon drum. A sample of the oil from one of the capacitors was collected and analyzed for PCBs. PCBs (specifically Aroclor 1016) were detected at 1,640,000 milligrams per Liter [mg/L]. The two capacitors measured approximately 24" tall x 16" wide x 6" deep (or approximately 10 gallons each). The assumption was made that each capacitor had a void space (and therefore oil volume) of 10%, or 1 gallon. In addition, it is suspected that there may have been a third capacitor that went unnoticed that could potentially be in the roll-off bin of scrap metal.

The area of concern is unpaved and consists of reddish brown silty clay. The surface soil in the area is fairly permeable. Booms have been installed around the initial area of concern (which measures

approximately 80 feet by 90 feet) to contain any storm water runoff from exiting the area and potentially contaminating more of the Property.

SECTION 3 – INITIAL ASSESSMENT, CLEANUP, AND DISPOSAL

3.1 INITIAL ASSESSMENT OF HEAVY EQUIPMENT

To assess whether heavy equipment used during the demolition of the MCC has been contaminated with PCBs, wipe samples will be collected from the components of the excavator, backhoe, and bobcat that most likely would be contaminated. Accordingly, wipe samples will be collected from the buckets, controls, tracks/tires, handles, floorboards, and steps of each piece of equipment. Samples will be collected in accordance with 40 CFR Part 761 (Subpart P) and analyzed for PCBs using Environmental Protection Agency [EPA] Method 8082.

On November 27 and December 5, 2013, the initial assessment of the heavy equipment was conducted. The initial assessment involved collecting wipe samples from the buckets, controls, tracks/tires, handles, floorboards, and steps from the three pieces of heavy equipment. PCBs were only detected in samples collected from the excavator bucket, the excavator driver side track, and the bobcat bucket. PCBs were not detected in any of the wipe samples at concentrations above the PCB Cleanup Standard for low contact industrial surfaces (100 micrograms per 100 square centimeters [µg/100cm^2]). PCBs (10 to 35.9 µg/100cm^2) were detected in two samples collected from the excavator bucket (samples EX.B.1in5 and EX.B.14) at concentrations above the PCB Cleanup Standard for high-contact industrial surfaces. PCBs were not detected at concentrations above the PCB Cleanup Standard for high-contact industrial surfaces in any other samples. A detailed description of the sampling procedures along with the sample results will be included in the final PCB Release Response Assessment and Remediation Report.

3.2 INITIAL CLEANUP AND DISPOSAL OF ASSUMED PCB REMEDIATION WASTE

All assumed PCB remediation waste will be disposed of in accordance with 40 CFR 761 Subpart D and K. Specifically, all suspected or assumed PCB contaminated scrap metal (including the MCC chassis which will be cut up), will be placed into Department of Transportation [DOT] hazardous waste compliant bulk bins using the contaminated excavator bucket referenced above.

After removal of the stockpiled waste, the excavator will be used to remove the first foot of soil in the areas most likely to have been impacted by PCBs. These areas include the east end of the MCC (the area where the capacitor was first discovered) and the two scrap metal stockpiles. The excavated soil will be assumed to be PCB remediation waste. The areas most likely to have been impacted by PCBs are shown in Figure 7 and the total area measures approximately 30 feet by 30 feet. The excavated soil will be placed into the same bins containing the scrap metal. The bins will remain onsite in the event additional PCB waste needs to be removed and disposed of following the verification sampling. Following completion of the cleanup, the bins will be shipped to Chemical Waste Management of the Northwest in Arlington, Oregon, for disposal.

SECTION 4 – VERIFICATION SOIL SAMPLING AND ADDITIONAL REMEDIAL EXCAVATION

The initial area of concern was extended approximately 30 feet to the north to encompass a natural depression outside the contained area. The concern is that PCB-contaminated storm water may have discharged beneath the filter socks on the north side of the initial area of concern and collected in the natural depression. The final area of concern (which includes the natural depression) measures approximately 110 feet by 90 feet.

Upon completion of excavation activities, soil samples will be collected from the final area of concern. The soil samples will be collected in accordance with 40 CFR 761.130 to ensure that the lateral and vertical extent of PCB impacted soil has been removed. Specifically, the sampling scheme outlined in the Midwest Research Institute's *Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup* [Field Manual) (EPA, 1986) will be used to determine the location and number of samples. If analytical results indicate that additional remediation is required, the Field Manual will be used to develop a new sampling strategy based upon the newly established area of concern.

4.1 SOIL SAMPLE LOCATIONS

The final area of concern measures approximately 110 feet by 90 feet. The Field Manual sample design procedure was used to determine the sample locations. To determine sample locations, a sample circle (which encompasses the entire final area of concern) was laid out over the area. The radius of the sample circle was calculated to be approximately 71 feet. Based on the Field Manual (Section 5.4, Table 1), a total of 37 samples should be collected from a sample circle with a radius greater than 11 feet.

Sample locations were then determined based on the Field Manual hexagonal sampling grid design and procedures. Of the 37 sample locations, 31 fall within the area of concern. Thus a total of 31 soil samples will be collected. The sample grid and sample locations are shown in Figure 8.

4.2 SOIL SAMPLE COLLECTION PROCEDURES

Soil samples will be collected from each sample location. To collect a sample, a new, clean disposable Teflon-lined scoop will be used to collect approximately 70 grams of surface soil at each sample location. The soil will then be dispensed into a clean, laboratory-supplied, 8-ounce [oz] glass jar. The jar will then be capped with a Teflon-lined cap, labeled, and placed in a cooler with wet ice. The samples will be delivered under chain of custody to Australian Laboratory Services [ALS] for analysis. Since new disposable sample collection supplies will be used for each sample, decontamination liquid will not be generated.

4.3 SOIL SAMPLE MANAGEMENT AND HANDLING

Pertinent information regarding the Property and sampling procedures will be documented in indelible ink in a project field logbook that is bound and has numbered water-resistant pages. Notations will be made in logbook fashion, noting the date and time of all entries. Information recorded in the logbook includes, but is not limited to, the following.

- Name and location of the Property.
- Date and time of arrival and departure.
- Names of all persons on-site and company they represent.
- Weather conditions during field sampling.
- Name of person keeping log.
- Purpose of the visit.
- Available information on the Property (processes and waste generation).
- Field instruments used and purpose of use, field instrument calibration, field readings.
- Sampling points.
- Date and time of sample and data collection and any factors that may affect their quality.
- Any deviation from the work plan (i.e., changes to the sample locations) with justifications for changes.

Sample containers will be written in indelible/waterproof ink and will be securely fastened to the container or bag. Replicate samples will be labeled in a manner that will not allow the laboratory to identify or correlate the replicates to the primary samples. ESI will assign the replicate samples a sample name beyond the range of existing sample numbers. An example is provided below.

Primary Sample	Field Duplicate	Field Triplicate
Ex.1.1	Ex.1.28	Ex.1.29

4.4 LABORATORY ANALYSIS AND PROJECT ACTION LEVELS

Prior to analysis, ALS will extract the samples using Soxhlet extraction method (EPA 3541).The samples will be analyzed for PCBs using EPA Method 8082.The samples will be analyzed in accordance with EPA standards (EPA, 2008). The laboratory results will be compared to PCB cleanup levels for High Contact Areas without further conditions (≤ 1 part per million [ppm]) herein referred to as the PAL (40 CFR 761.61(a)(4)(i)(A)).

4.5 ADDITIONAL REMEDIAL EXCAVATION

If laboratory results indicate that PCB impacted soil is still present at concentrations above the PAL, additional remedial excavation will be conducted using the excavator. The additional remedial excavation will be conducted at the sample location where PCBs were detected at concentrations above the PAL. The additional excavation will extend half the distance to the

adjacent (clean – less than 1 ppm) sample location (e.g., 9 feet in each direction), and half the distance to the row (clean – less than 1 ppm) above and below the sample point (e.g., 8 feet). The excavation will extend an additional 1 foot in depth. The Field Manual will then be used to determine the sampling scheme for the new area of concern.

SECTION 5 – QUALITY ASSURANCE PROJECT PLAN

This section summarizes the Quality Assurance [QA] and Quality Control [QC] procedures to be used to ensure that the sample data collected are of sufficient quality to make appropriate decisions as to whether additional assessment or remediation is warranted.

5.1 INTENDED USE OF THE DATA

Analytical data acquired over the course of this project will be verified and validated in-house and will be of sufficient quality to meet the intended use of the data.

5.2 FIELD SAMPLING QA/QC PROCEDURES

Field QA Procedures

The procedures outline in this work plan will be followed to ensure that samples are properly collected, managed, shipped, and analyzed. The QA procedures include but are not limited to keeping sample containers in coolers and chilled during and after sample collection; labeling sample containers with appropriate sample names, collection times, and dates; completing chain-of-custody forms and following chain-of-custody procedures.

Field QC Procedures

The QC procedures for ensuring that samples are properly collected, managed, shipped and analyzed consists of cross-checks that will be performed by ESI QA/QC personnel. The QA/QC personnel will check sample locations, sample labels, sample volumes, field notes, chain-of-custody forms, packaging, and shipping documents to ensure established procedures are followed.

5.3 ANALYTICAL DATA QA/QC PARAMETERS

The quality of laboratory analytical data will be assessed in terms of precision, accuracy, representativeness, comparability, and completeness [PARCC] parameters. Precision and accuracy are quantitative parameters that directly determine the acceptability of chemical data from the laboratory. Qualitative parameters include representativeness, completeness, and comparability. The calculation and objectives of each data quality indicator are described in the following sections.

5.3.1 Precision

Precision will be assessed through analysis of field duplicate and field triplicate samples, laboratory duplicate and laboratory triplicate samples, and matrix spike [MS] and matrix spike duplicate [MSD] samples. Precision is determined through relative percent difference [RPD] when two samples are being compared (e.g., groundwater and soil vapor field duplicates) and relative standard deviation [RSD] when three or more samples are being compared (e.g., soil

field triplicates and laboratory triplicates). The calculations for RPD and RSD are provided below.

$$RPD = \left[\left(D1 - D2\right)/0.5\left(D1 + D2\right)\right] \times 100$$

where
D1 = Concentration of analyte in sample 1
D2 = Concentration of analyte in sample 2

$$100 \times \frac{\sqrt{\sum_{i=1}^{n}\left(D_i - \overline{D}\right)}}{\overline{D}}$$

where:
D_i = Concentration of analyte in sample
$\bar{D}$ = Average concentration of n samples
n = number of samples

5.3.2 Accuracy

Accuracy will be assessed using surrogate spikes, laboratory control samples [LCS], method blanks, and MS/MSD samples. Default accuracies are expressed as percent recovery [%R] which is calculated using the following equation.

$$\%R = \left(A - B\right)/C \times 100$$

where:
A = measured concentration of the spiked analyte in the spiked sample
B = measured concentration of the spiked analyte in the unspiked sample
C = concentration of the spiked analyte

5.3.3 Representativeness

Representativeness will be ensured through appropriate sampling procedures, selection of analytical methods, sample identification, holding times, chain-of-custody forms, and replicate samples. Care will be taken to collect samples that represent the site conditions.

5.3.4 Comparability

Comparability will be controlled by consistent application of the procedures outlined in this document. Analytical methods, reporting limits, and units of measurement will be consistent.

5.3.5 Completeness

Completeness will be assessed as the percent of valid analytical data that is produced and will be based on the project manager's findings. In addition, completeness will be assessed further using precision, accuracy, and representativeness. The goal for completeness for each analyte is 95 percent.

5.3.6 Project Reporting Limits

The target Method Reporting Limit [MRL] for PCBs is 0.2 ppm. If the lowest achievable MRL is higher than the target MRL but below the PAL, the result may still be useable for this project. If the lowest achievable MRL that the laboratory can attain is higher than the PAL, the MRL will be used as the PAL.

5.4 QA/QC Checks

QA/QC checks are necessary to evaluate field sample collection methods and laboratory performance. Field QA/QC samples include field duplicates and triplicates to be analyzed by the laboratory. Laboratory QA/QC samples include laboratory duplicate and triplicate samples, surrogates, method blanks, MS/MSD samples, and LCSs that are used to evaluate accuracy, precision, and matrix interferences. The laboratory will be required to follow the QA/QC checks in Table 5.1 and will include the results in the laboratory reports. The field QA/QC samples and the laboratory QA/QC samples for this project are identified in Table 5.1.

5.5 ANALYTICAL METHODS

Sample preparation, analytical, calibration, and preventive maintenance procedures to be used by the laboratory are discussed in this section. The analytical methods are described in the EPA SW-846 Manual, *Test Methods for Evaluating Solid Waste* (EPA, 2008).

Laboratory analytical procedures will include calibration of instruments, sample preparation and analysis, preventive maintenance, and corrective actions. The analytical methods used are described in the EPA SW-846 Manual, *Test Methods for Evaluating Solid Waste* (EPA, 2008).

TABLE 5.1
Summary of Field and Laboratory QA/QC Samples
Grace Pacific Lower Makakilo Facility
Work Plan - PCB Release Response

Samples	Minimum Frequency of Occurrence
Field QA/QC	
Soil Sample Replicates (Duplicate)	1 per every 10 samples.
Laboratory QA/QC	
Sample Replicates (Duplicate)	1 for every 20 samples.
Surrogate Spike	Every sample for organic analysis by gas chromatography.
LCS/LCSD	1 for every 20 samples.
MS/MSD	1 MS/MSD for every 20 samples.
Method Blank	1 method blank for each analytical batch.

QA Quality Assurance
QC Quality Control
LCS/LCSD Laboratory Control Sample/Laboratory Control Sample Duplicate
MS/MSD Matrix Spike/Matrix Spike Duplicate

SECTION 6 – DECONTAMINATION

All equipment that may have been in contact with PCB-contaminated material (e.g., excavator thumb and bucket) that are anticipated to be reused will be decontaminated using the double wash/rinse method outlined in 40 CFR Part 761 Subpart S.

SECTION 7 – INVESTIGATION-DERIVED WASTE

It is anticipated that the following PCB waste will be generated during this project and will require management and disposal. Investigation-derived waste [IDW] will be properly classified, labeled, managed, manifested, and disposed of in accordance with federal and state regulations.

- Scrap Metal and Demolition Debris – Demolition debris and scrap metal classified as PCB remediation waste will be placed into DOT hazardous waste compliant bulk bins. The bins will be shipped to Chemical Waste Management of the Northwest in Arlington, Oregon, for disposal.

- Decontamination Liquid – Decontamination liquid will be placed into an evaporation cell onsite and allowed to evaporate.

- Soil – Excavated soil classified as PCB remediation waste will be placed into DOT hazardous waste compliant bulk bins and/or 1 cubic yard super-sacks. The bins and sacks will be shipped to Chemical Waste Management of the Northwest in Arlington, Oregon, for disposal.

- Miscellaneous Waste – Miscellaneous waste (i.e., disposable personal protective equipment [PPE], sampling equipment, plastic sheeting) will be placed into a 55-gallon drum. The drums will be shipped to Chemical Waste Management of the Northwest in Arlington, Oregon, for disposal.

SECTION 8 – REFERENCES

Atlas of Hawaii, 1983, Department of Geography, University of Hawaii Press.

Brewer Environmental Services, 1996, UST Closure, Overexcavation, and Soil Sampling Report – 10,000-Gallon and 6,000-Gallon Diesel Underground Storage Tanks, Grace Pacific Corporation, 91-920 Farrington Highway, Kapolei, Oahu, Hawaii: Brewer Environmental Services, Job No. 4100, July 8, 1996.

DLNR, 1985, Pan Evaporation: State of Hawai'i 1894-1983: Report R74, Division of Water and Land Development, August 1995.

DLNR, 1986, Rainfall Atlas of Hawaii: Report R76, Division of Water and Land Development, June 1986.

EPA, 1986, Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, EPA -560/5-86-017, May 1986.

EPA, 2008, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), Third Edition & All Promulgated Updates: U.S. Environmental Protection Agency. On-line at http://www.epa.gov/epaoswer/hazwaste/test/main.htm.

Foote, D. E., Hill, E. L., Nakamura, S. and Stephens, F., 1972, U.S. Department of Agriculture. Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii: Soil Conservation Service in Cooperation with the University of Hawaii Agricultural Experiment Station.

Macdonald, G. A., Abbot, A. T. and Peterson, F. L., 1983, *Volcanoes in the Sea: The Geology of Hawaii*, University of Hawaii Press, 517 p.

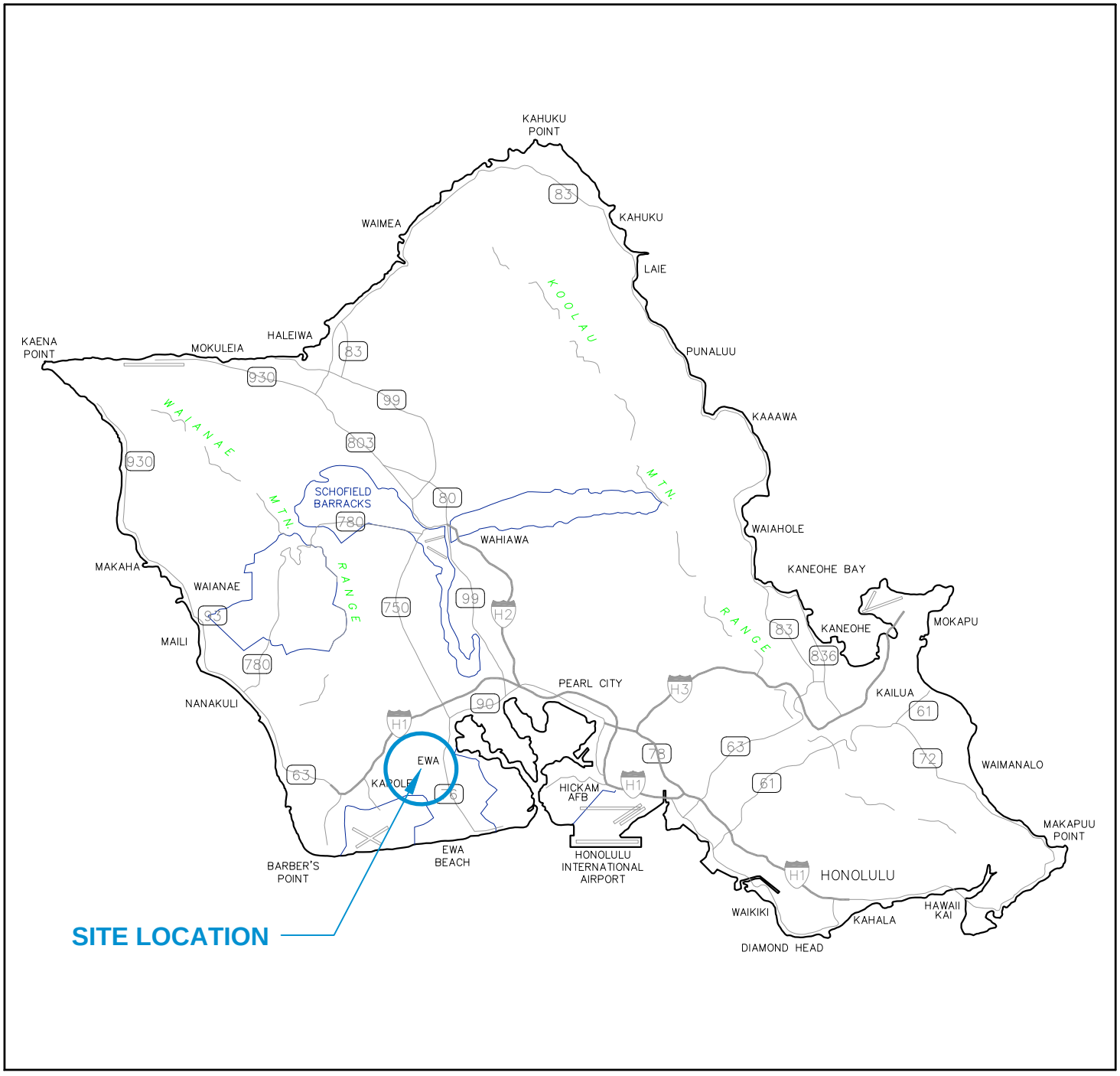
Mink, J. F. and Lau, L. S., 1990, Aquifer Identification and Classification for the Island of Oahu: Groundwater Protection Strategy for Hawaii: Water Resources Research Center Technical Report No. 179, February 1990.

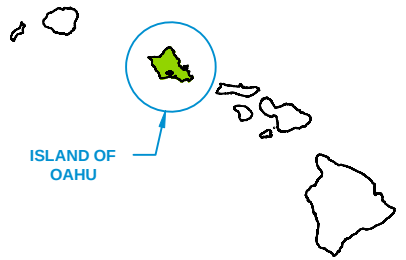
Presley, T. K., et al., 1997, *Postshield Volcanism and Catastrophic Mass Wasting of the Waianae Volcano, Oahu, Hawaii.* Bull Volcanol 58:597-616.

Stearns, H. T. and Vaksvik, K. N., 1935, Geology and Groundwater Resources of the Island of Oahu, Hawaii: Hawaii Div. Hydrogr. Bull. 1, 479 p.

Stearns, H. T. and Vaksvik, K. N., 1938, Records of Drilled Wells on the Island of Oahu, Hawaii: Hawaii Div. Hydrogr. Bull. 4, 213 p.

FIGURES





Hawaiian Islands

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Island of Oahu GIS, USGS Clearinghouse

NORTH

GRAPHIC SCALE

7 0 7

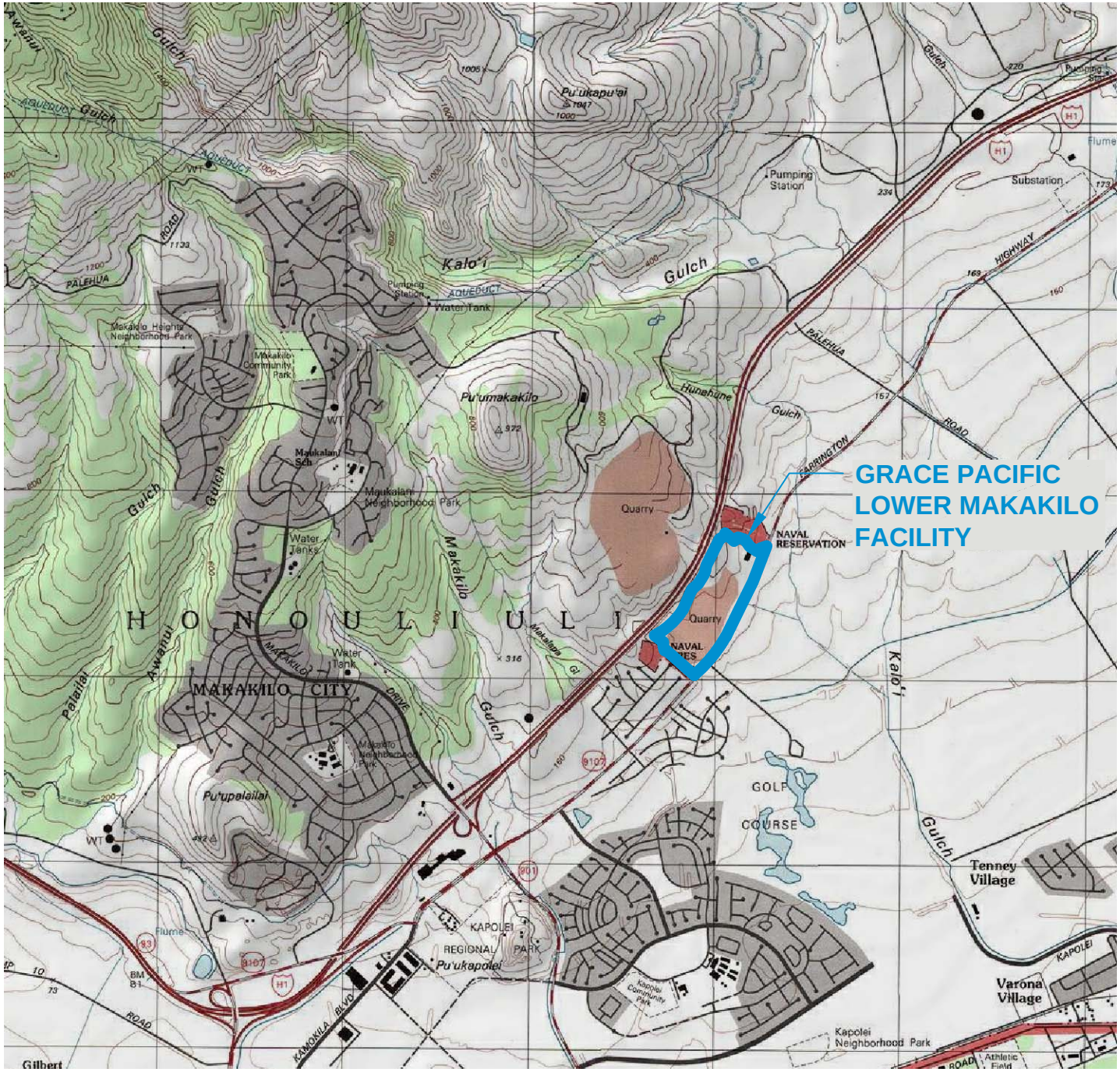
Scale in Miles

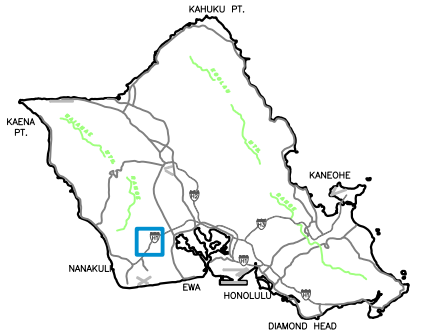
FIGURE 1

REGIONAL LOCATION MAP (ISLAND OF OAHU)

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-920 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL





Map Location on Island of Oahu

NOTES

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SOURCES

Island of Oahu GIS, USGS Clearinghouse

TOPO! Version 4.2.7 Software Program

NORTH

GRAPHIC SCALE

0.5 0 0.5

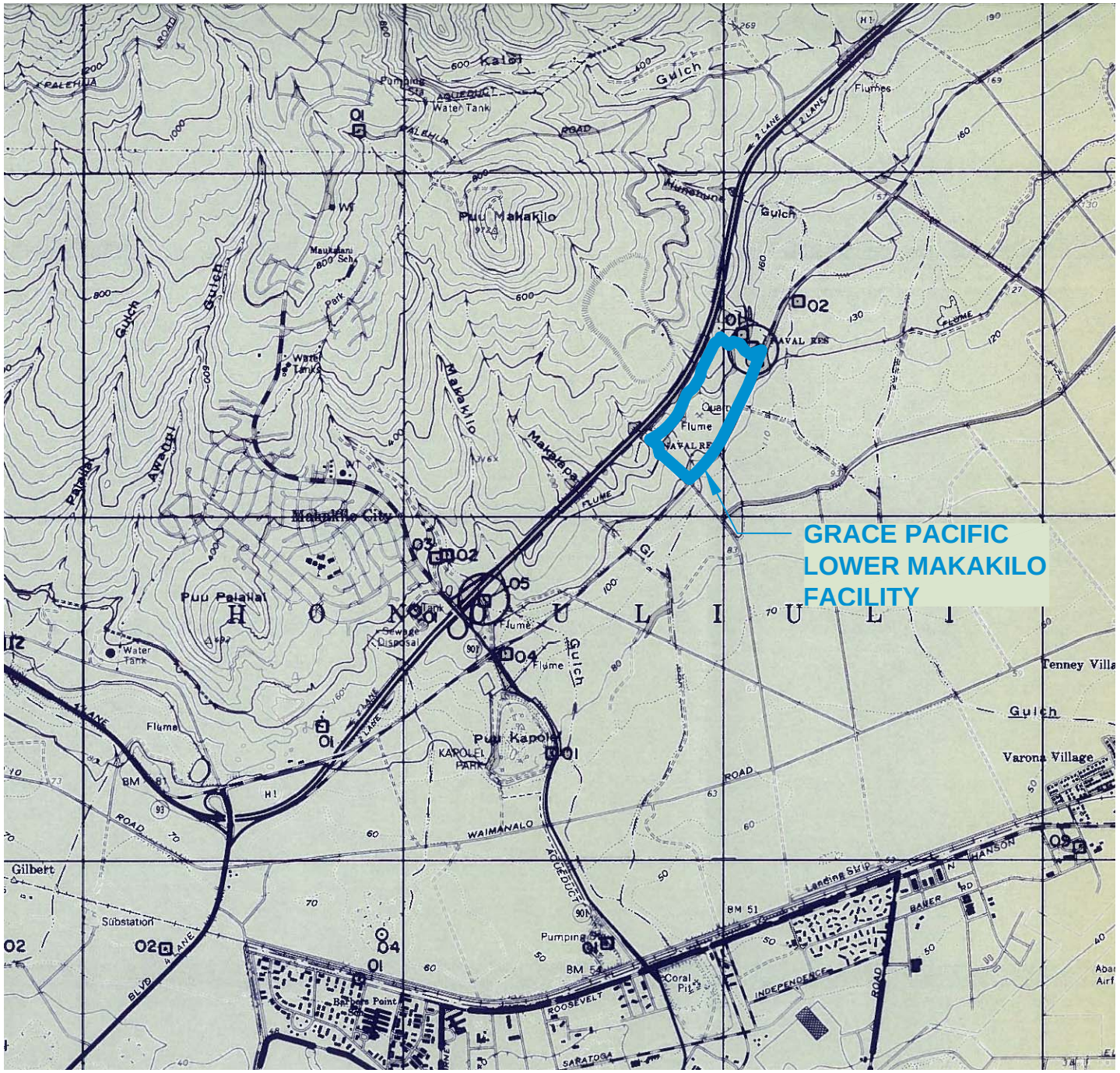
Scale in Miles

FIGURE 2

SITE AREA TOPOGRAPHIC MAP

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL



LEGEND

- UNDERGROUND INJECTION CONTROL (UIC) LINE
- DRINKING SOURCE
- INJECTION WELL
- OTHER WELL

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

O-6, Ewa, Hawaii, State of Hawaii, Department of Health, Underground Injection Control Program, Effective - July 6, 1984, U.S. Department of the Interior Geological Survey, 1983.

NORTH

GRAPHIC SCALE

0.5 0 0.5

Scale in Miles

FIGURE 3

UIC LINE AND WELL LOCATION MAP

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-920 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL

ALTA/ACSM Land Title Survey
of
LOTS 2544-A, 2544-B, and 15 as shown on Map 12 & 1188 of Land Court Application 1069
at
Honouliuli, Ewa, Oahu, Hawaii
TMK: (1) 9-1-16: 4

PROPERTY DESCRIPTION – LOT 2544-A

SCHEDULE B

1. Real Property Taxes, Second Installment, Fiscal Year July 1, 2005 – June 30, 2006. (see tax statement attached)

Lot 2544-A is covered by Tax Key (1) 9–1–016–004.

–Note:– Attention is invited to the fact that the premises covered herein may be subject to possible rollback or retroactive property taxes.

2. DESIGNATION OF EASEMENT "91"

SHOWN: on Map 41, as set forth by Land Court Order No. 6492, filed November 24, 1945

3. The terms and provisions, including the failure to comply with any covenants, conditions and reservations, contained in the following:

INSTRUMENT: PRE–CONDEMNATION RIGHT OF ENTRY AGREEMENT

Dated: October 19, 1971
Filed: Land Court Document No. 585880
Recorded: Liber 8059 Page 309
Parties: STATE OF HAWAII, by its Director of Transportation, "State", ALAN S. DAVIS, M. L. RANDOLPH and FRED E. TROTTER, III, Trustees under the Will and of the Estate of James Campbell, Deceased, "Grantor", and OAHU SUGAR COMPANY, LIMITED, "Lessee"
Re: granting a right of entry to take possession of that certain Easement Area as shown on the Plans for the Energy Corridor, Section I (Project No. H.C. 1084) approved July 2, 1971, filed in the Harbors Division, Department of Transportation, State of Hawaii, for the purposes of inspection, survey, preparation for and construction of said Energy Corridor Project

The interest of the STATE OF HAWAII, by its Director of Transportation, was assigned to HAWAIIAN INDEPENDENT REFINERY, INC., a Hawaii corporation, by instrument dated January 13, 1972, filed as Land Court Document No. 566790, recorded in Liber 8074 at Page 30.

–Note:– Land Court Order No. 140739, filed January 26, 2001, sets for the change of the name of HAWAIIAN INDEPENDENT REFINERY, INC. to BHP PETROLEUM AMERICAS REFINING, INC. and the change of name of BHP PETROLEUM AMERICAS REFINING, INC. to TESORO HAWAII CORPORATION. (Not noted on Transfer Certificate(s) of Title referred to herein)

4. Abutters' rights of access in favor of the STATE OF HAWAII, as set forth in Final Order of Condemnation dated December 13, 1972, filed in the Circuit Court of the First Circuit, State of Hawaii, civil No. 17197, filed as Land Court Document No. 615467.

5. Abutters' rights of access in favor of the STATE OF HAWAII, as set forth in Final Order of Condemnation dated December 13, 1972, filed in the Circuit Court of the First Circuit, State of Hawaii, civil No. 17295, filed as Land Court Document No. 615482.

6. DESIGNATION OF EASEMENT "714"

Shown: on Map 227, as set forth by Land Court Order No. 37259, filed April 6, 1973

7. Restriction of access rights, as shown on Map 227, as set forth by Land Court Order No. 37259, filed April 6, 1973.

8. The terms and provisions, including the failure to comply with any covenants, conditions and reservations, contained in the following:

Instrument: DECLARATION OF CONDITIONS
Dated: June 22, 1973
Recorded: Document No. 647233

9. GRANT

To: STATE OF HAWAII, by its Director of Transportation
Dated: June 21, 1973
Filed: Land Court Document No. 649192
Granting: and exclusive and perpetual easement and right–of–way for an underground energy transmission system

10. GRANT

To: HAWAIIAN ELECTRIC COMPANY, INC.
Dated: March 12, 1992
Filed: Land Court Document No. 1972493
Granting: a perpetual right and easement for electrical purposes

11. DESIGNATION OF EASEMENT "6631"

Purpose: drainage
Shown: on Map 935, as set forth by Land Court Order No. 132194, filed July 28, 1998

12. GRANT

To: HAWAIIAN ELECTRIC COMPANY, INC.
Dated: May 25, 2000
Filed: Land Court Document No. 2629963
Granting: a perpetual right and easement for electrical purposes

13. RESTRICTION OF VEHICLE ACCESS RIGHTS

Along: the boundary of Lot 2544–A and Lot 2544–B
Shown: on Map 1188, as set forth by Land Court Order No. 157963, filed September 8, 2004

14. DESIGNATION OF EASEMENT "8520"

Purpose: gas regulator station
Shown: on Map 1249, as set forth by Land Court Order No. 161736, filed June 13, 2005

SCHEDULE C

All of that certain parcel of land situate at Honouliuli, District of Ewa, City and County of Honolulu, State of Hawaii, described as follows:

LOT 2544–A, area 53.612 acres, more or less, as shown on Map 1188, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court 1069 of the Trustees under the Will and of the Estate of James Campbell, deceased;

Being the land(s) described in Transfer Certificate of Title No. 714,470 issued to C. R. CHURCHILL, D. A. HEENAN, RICHARD W. GUSHMAN, II, and RONALD J. ZLATOPER, Trustees under the Will and of the Estate of James Campbell, deceased.

PROPERTY DESCRIPTION – LOT 2544–B

SCHEDULE B

2. The terms and provisions, including the failure to comply with any covenants, conditions and reservations, contained in the following:

Instrument: Pre–condemnation right of entry agreement
Dated: October 19, 1971
Recorded: Liber 8059 Pg. 309
Parties: State of Hawaii, by its Director of Transportation, State, Alan S. Davis, M. L. Randolph and Fred E. Trotter, III, Trustees under the Will and of the Estate of James Campbell, deceased, Grantor, and Oahu Sugar Company, Limited, Lessee
Re: granting a right of entry to take possession of that certain Easement Area as shown on the Plans for the Energy Corridor, Section I (Project No. H.C. 1084) approved July 2, 1971, filed in the Harbors Division, Department of Transportation, State of Hawaii, for the purposes of inspection, survey, preparation for and construction of said Energy Corridor Project

The interest of the STATE OF HAWAII, by its Director of Transportation, was assigned to HAWAIIAN INDEPENDENT REFINERY, INC., a Hawaii corporation, by instrument dated January 13, 1972, filed as Land Court Document No. 566790, recorded in Liber 8074 at Page 30.

3. Designation of Easement 714

Shown: on Map 227, as set forth by Land Court Order No. 37259, filed April 6, 1973

4. The terms and provisions, including the failure to comply with any covenants, conditions and reservations, contained in the following:

Instrument: DECLARATION OF CONDITIONS
Dated: June 22, 1973
Recorded: Document No. 647233

5. Grant

To: State of Hawaii, by its Director of Transportation
Dated: June 21, 1973
Filed: Land Court Document No. 649192
Granting: an exclusive and perpetual easement and right of way for an underground energy transmission system

6. Grant

To: Hawaiian Electric Company, Inc.
Dated: May 26, 2000
Filed: Land Court Document No. 2629963
Granting: a perpetual right and easement for electrical purposes

SCHEDULE C

All of that certain parcel of land situate at Honouliuli, District of Ewa, City and County of Honolulu, State of Hawaii, described as follows:

Lot 2544–B, area 0.034 acre, more or less, as shown on Map 1188, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court 1069 of the Trustees under the Will and of the Estate of James Campbell, deceased

Being the land(s) described in Transfer Certificate of Title No. 714,471 issued to C.R. CHURCHILL, D. A. HEENAN, RICHARD W. GUSHMAN, II, and RONALD J. ZLATOPER, Trustees under the Will and of the Estate of James Campbell, deceased.

PROPERTY DESCRIPTION – LOT 15

SCHEDULE C

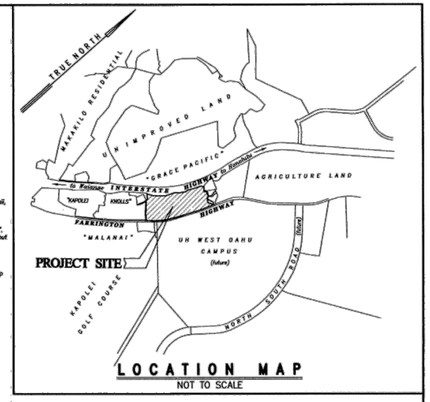
All of that certain parcel of land situate at Honouliuli, District of Ewa, City and County of Honolulu, State of Hawaii, described as follows:

Lot 15, area 0.280 acre, more or less, as shown on Map 12, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 1069 of the Trustees under the Will and of the Estate of James Campbell, deceased.

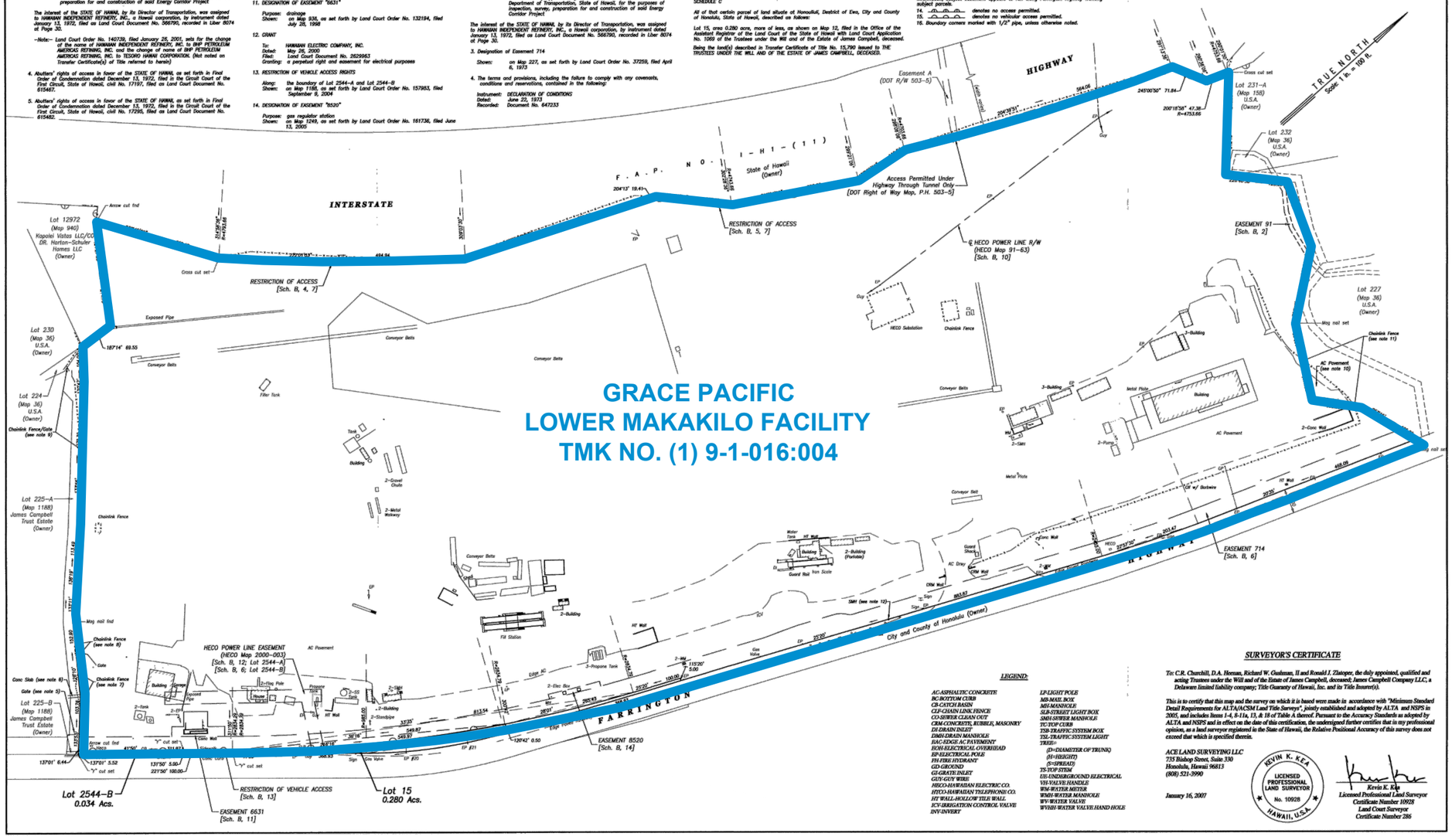
Being the land(s) described in Transfer Certificate of Title No. 15,790 issued to THE TRUSTEES UNDER THE WILL AND OF THE ESTATE OF JAMES CAMPBELL, DECEASED.

Notes:

1. This SURVEY is based on preliminary title reports provided by Title Guaranty of Hawaii, Inc.: Lot 2544–A dated January 12, 2006, Order No. 2006003540; Lot 2544–B dated January 12, 2006, Order No. 2006003541; Lot 15 dated January 12, 2006, Order No. 2006003562.
2. Origin of azimuths referred to Government Survey Triangulation Station "Kapoai Nee".
3. Subject parcel lies within Zone D, areas in which flood hazards are undetermined, but possible. Information taken from Flood Insurance Rate Map (FIRM), City & County of Honolulu, Hawaii, Map No. 15003C0315F, map revision date September 30, 2004.
4. No visible evidence subject parcel is being used as a sanitary landfill.
5. Gate appurtenant to adjoining lot extends into subject lot 1.6'.
6. Concrete slab, partially buried, crosses within subject lot and adjoining lot, ownership unknown.
7. Chain link fence appurtenant to subject lot crosses into adjoining lot 7.6' at it's greatest point for a length of 70.1'.
8. Chain link fence appurtenant to subject lot crosses into adjoining lot 1.7' at it's greatest point for a length of 24.4'.
9. Chain link fence and gate appurtenant to subject lot lies within adjoining lot for a length of 166.4'.
10. AC pavement appurtenant to subject lot extends into adjoining lot 63.5' at it's greatest point.
11. Chain link fence appurtenant to subject lot crosses into adjoining lot for a length of 136.8'.
12. Sewer manhole straddles boundary line.
13. Under Schedule B, Items 3 and 9 for subject Lot 2544–A, and Schedule B, Items 2 and 5 for subject Lot 2544–B are easement for an underground energy corridor is located as shown on the exhibit within said Land Court document, its exact location cannot be shown on the subject map however due to a lack of sufficient information, subject easement appears to run along Farrington Highway fronting subject parcels.
14. denotes no access permitted.
15. denotes no vehicular access permitted.
16. Boundary corners marked with 1/2" pipe, unless otherwise noted.



LOCATION MAP
NOT TO SCALE



LEGEND:

AC-ASPHALTIC CONCRETE
BC-BOTTOM CURB
CB-CATCH BASIN
CLF-CHAIN LINK FENCE
CO-SEWER CLEAN OUT
CRM-CONCRETE, RUBBLE, MASONRY
DI-DRAIN INLET
DMH-DRAIN MANHOLE
EAC-EDGE AC PAVEMENT
EOH-ELECTRICAL OVERHEAD
EP-ELECTRICAL POLE
FH-FIRE HYDRANT
GD-GROUND
GI-GRATE INLET
GUY-GUY WIRE
HECO-HAWAIIAN ELECTRIC CO.
HTCO-HAWAIIAN TELEPHONE CO.
HT WALL-HOLLOW TILE WALL
ICV-IRRIGATION CONTROL VALVE
INV-INVERT
LP-LIGHT POLE
MB-MAIL BOX
MH-MANHOLE
SLB-STREET LIGHT BOX
SMH-SEWER MANHOLE
TC-TOP CURB
TSB-TRAFFIC SYSTEM BOX
TSL-TRAFFIC SYSTEM LIGHT
TREE=
(D=DIAMETER OF TRUNK)
(H=HEIGHT)
(S=SPREAD)
TS-TOP STEM
UG-UNDERGROUND ELECTRICAL
VH-VALVE HANDLE
WM-WATER METER
WMH-WATER MANHOLE
WV-WATER VALVE
WVHH-WATER VALVE HAND HOLE

SURVEYOR'S CERTIFICATE

To: C.R. Churchill, D.A. Heenan, Richard W. Gushman, II and Ronald J. Zlatoper, the duly appointed, qualified and acting Trustees under the Will and of the Estate of James Campbell, deceased; James Campbell Company LLC, a Delaware limited liability company; Title Guaranty of Hawaii, Inc. and its Title Insurer(s).

This is to certify that this map and the survey on which it is based were made in accordance with "Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys", jointly established and adopted by ALTA and NSPS in 2005, and includes Items 1-4, 6-11a, 13, & 16 of Table A thereof. Pursuant to the Accuracy Standards as adopted by ALTA and NSPS and in effect on the date of this certification, the undersigned further certifies that in my professional opinion, as a land surveyor registered in the State of Hawaii, the Relative Positional Accuracy of this survey does not exceed that which is specified therein.

ACE LAND SURVEYING LLC
735 Bishop Street, Suite 330
Honolulu, Hawaii 96813
(808) 521-3990

January 16, 2007

KEVIN K. K'EA
LICENSED PROFESSIONAL LAND SURVEYOR
No. 10928
HAWAII, U.S.A.

Kevin K. K'ea
Licensed Professional Land Surveyor
Certificate Number 10928
Land Court Surveyor
Certificate Number 286

LEGEND

ESTIMATED PROPERTY BOUNDARY

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Grace Pacific Corporation.

NORTH

GRAPHIC SCALE

250 0 250

Scale in Feet

FIGURE 4

TMK MAP

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL

LEGEND

- ESTIMATED PROPERTY BOUNDARY
- ESTIMATED BOUNDARY FOR CENTRAL OPERATING AREA
- ESTIMATED BOUNDARY FOR EAST ROADWAY AREA
- ESTIMATED BOUNDARY FOR FORMER HAWAIIAN CEMENT MAINTENANCE SHOP & TRUCKING OFFICE
- ESTIMATED BOUNDARY FOR MAINTENANCE SHOP #2 AREA
- ESTIMATED BOUNDARY FOR UNDEVELOPED LAND AREA
- ESTIMATED BOUNDARY FOR FORMER QUARRY/AGGREGATE STOCKPILE AREA

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Grace Pacific Corporation.

NORTH

No Graphic Scale

FIGURE 5

SITE MAP - PRIOR TO DEMOLITION

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL

LEGEND

ESTIMATED PROPERTY BOUNDARY

AREA OF CONCERN

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Google Earth, 21° 21' 10.77" N, 158° 03' 57.94" W; January 29, 2013

Grace Pacific Corporation

NORTH

GRAPHIC SCALE

200 0 200

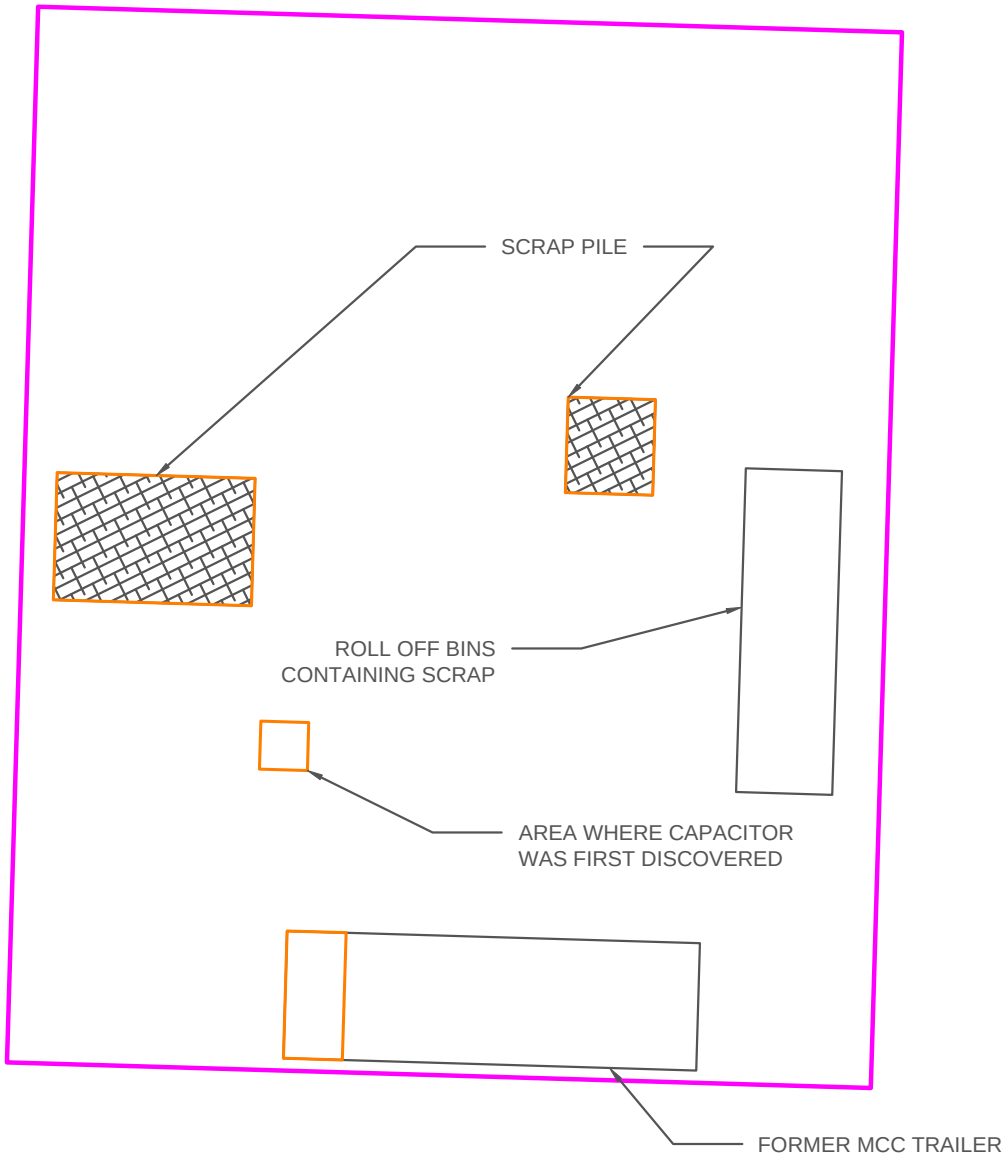
Scale in Feet

FIGURE 6

SITE MAP - POST DEMOLITION

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ESI
ENVIRONMENTAL SCIENCE INTERNATIONAL



LEGEND

- AREA OF CONCERN
- SCRAP PILE
- TEMPORARY STRUCTURE
- TOP 12 INCHES OF SOIL TO BE REMOVED PRIOR TO SAMPLING

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Grace Pacific Corporation.

NORTH

GRAPHIC SCALE

20 0 20

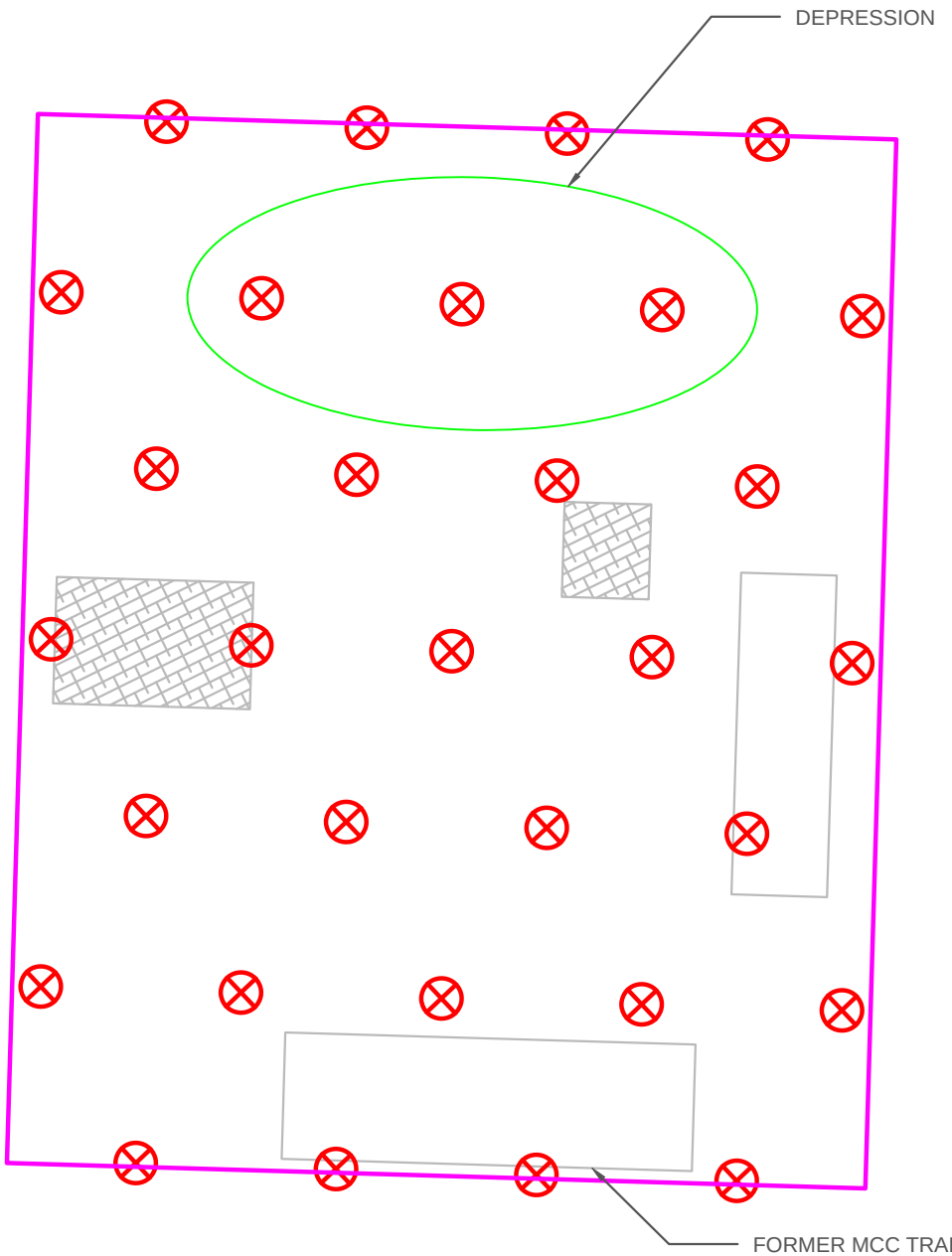
Scale in Feet

FIGURE 7

AREA OF CONCERN

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL



LEGEND

AREA OF CONCERN

SAMPLE LOCATION (31 TOTAL)

NOTES

The accuracy of this document is limited to the quality and scale of the source information. This document is not a legal representation of an engineered survey.

SOURCES

Grace Pacific Corporation.

NORTH

GRAPHIC SCALE

20 0 20

Scale in Feet

FIGURE 8

SAMPLE LOCATIONS

WORK PLAN - PCB RELEASE RESPONSE
GRACE PACIFIC LOWER MAKAKILO FACILITY
91-290 FARRINGTON HIGHWAY
KAPOLEI, HAWAII
TMK NO. (1) 9-1-016:004

ENVIRONMENTAL SCIENCE INTERNATIONAL

APPENDIX A

Photographic Documentation

MCC Prior to Demolition

	Appendix A - Photographs	Photo 1
	Work Plan – PCB Release Response	Kapolei, Hawaii
	Grace Pacific Lower Makakilo Facility	Project No. 113102

MCC After Demolition

	Appendix A - Photographs	Photo 2
	Work Plan – PCB Release Response	Kapolei, Hawaii
	Grace Pacific Lower Makakilo Facility	Project No. 113102

Scrap Piles

	Appendix A - Photographs	Photo 3
	Work Plan – PCB Release Response	Kapolei, Hawaii
	Grace Pacific Lower Makakilo Facility	Project No. 113102